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Knowledge of the sign prohibiting alcohol consumption during pregnancy among medical students in Poland – a survey study

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ABSTRACT

Signs, including pictograms, present in public space are intended to enforce a specific behavior. Due to their simplicity and unambiguity of the message, they can be an effective tool of public healthcare. The aim of this study was to assess the knowledge referred to the meaning of the sign prohibiting alcohol consumption during pregnancy among first-year medical students who do not have vast knowledge at present level in this field. The study was conducted among academic youth in Poland, and assumed a 5% risk of error, hence, for $p < 0.05$ the differences were considered statistically significant. Out of the total number, there were 1,123 questionnaire forms correctly completed and these were further selected for the final analysis, which comprised of 751 by women and 372 by men. Among the respondents, over 92% properly recognized the sign warning against the use of alcohol during pregnancy. Moreover, more than 45% declared previous contact with this sign and above 53% claimed that they already had knowledge of the sign's meaning. The graphic form of the sign allows for its correct interpretation, thus products which may become harmful especially to pregnant women and fetus can be clearly and legibly marked.

INTRODUCTION

Alcohol consumption, smoking cigarettes, as well as exposure to drugs and other toxic substances during pregnancy is becoming a significant public health problem around the world. Data from the field literature indicate that during pregnancy, up to 30% of all women smoke cigarettes, 15% regularly drink alcohol, 3-10% use cannabis, and 0.5-3% use cocaine. The most popular stimulants in this period are alcohol and cocaine, still, it is the alcohol which leads to birth defects among the cases most commonly found [1]. It is estimated that, globally, approximately 10% of all pregnant women drink alcohol and the highest percentage are those living in Europe (25%) [2]. According to WHO, the number of women in their reproductive age consuming

excessive amounts of alcohol is increasing around the world [3]. It is estimated that around 44-65% of all pregnancies are unplanned which involves a high risk of accidental embryos exposure to alcohol [4]. It needs to be stressed that fetus exposure to alcohol may lead to miscarriage, stillbirth, prematurity, low birth weight, IUGR (intrauterine growth restriction), as well as numerous congenital defects. Another important disorder with serious health and social consequences is fetal alcohol syndrome (FAS), characterized by impaired neurological and psychomotor development. It is estimated that 1 in 13 alcohol-exposed fetuses will develop FAS symptoms at birth [5]. Data show that treating patients with FAS costs national healthcare systems over \$20,000 a day [6]. Consuming alcohol while breastfeeding may also trigger behavioral disorders, agitation, sleep disorders and delays in cognitive development in infants [5].

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The effects of toxic substances depend on the age of the fetus. Some cause congenital defects acting throughout the whole period of pregnancy, others have adverse effects at specific stages of the child's development. Most organs and systems of the fetus are formed during the first 10 weeks of its life. Toxic substances such as alcohol taken proceeding the twentieth day of pregnancy work according to "all or nothing" principle – they can either lead to miscarriage or have no harmful effect at all. In later periods, their teratogenic effects become apparent - they disturb the proper growth and functioning of the fetal organs and induce congenital defects. It is assumed that the effects of consuming such substances following the tenth week of pregnancy may result in miscarriage, nervous system development disorder, intrauterine fetal growth restriction and premature birth [1]. According to Dathe *et al.* [7], no substances that may be teratogenic if taken by the child's father during conception have been identified so far. However, it should be noted that there is very little data found among available literature on that issue compared to information given about mothers.

In order to inform about toxic effects of substances during pregnancy, special pictograms have been developed, warning against taking a given product, smoking cigarettes and drinking alcohol. The aim of this study was to assess the knowledge of signs warning about alcohol toxicity for pregnant women and the fetus (Figure 1) among students of medical universities in Poland, even though this sign is not approved by the FDA and WHO. The knowledge of other signs informing about the risk of substance toxicity among Polish youth has been assessed so far in other works [8].



Figure 1. Sign recommending against alcohol consumption by pregnant women

MATERIAL AND METHODS

In order to determine conscious understanding of the signs prohibiting/ warning against alcohol consumption during pregnancy, an author's questionnaire was used, to be completed by first-year students of medicine, dentistry, obstetrics, nursing, electroradiology, dietetics and other faculties at the Medical University of Lublin, and at universities in Białystok, Gdańsk, Toruń and Cracow. Due to a large number of incorrectly filled in questionnaires, only 1,123 were selected for the final analysis. The study assumed a 5% risk of error, hence, differences were considered statistically significant at $p < 0.05$. Among the respondents, 66.87% were women and 33.13% were men. Their ages ranged from 16 to 30, with the median age 19. A majority (716, i.e. 63.76%) were students of medical faculties. The respondents most

often indicated cities with over 40,000 inhabitants as their place of upbringing and their place of residence. Most of the surveyed came from families, both parents of which had a background of higher education. Out of those who returned the questionnaire, 97.06% declared that they were financially supported by their parents. The financial status of the family was most often (69.63%) described as an average. Within the target group, 88.69% came from families where both parents were present.

RESULTS

Out of 1,123 participants, 1,038 students (92%), correctly recognized the sign (Table 1). The survey also revealed that over 45% of the respondents confirmed previous contact with the sign (Table 2), while over 53% claimed that they had previous knowledge of the sign's meaning (Table 3). Moreover, about 45% of the respondents pointed to Poland as the place of their first encounter with the sign. The period in which the respondents first came across the warning was up to 1 year or 2 years prior to date of the survey. Among the most common answers (9.17%, i.e. 103 people) were those that stated that the respondents had seen that symbol for the first time on a beer packaging.

Table 1. Correct recognition of the sign

	n	%
Contraceptives or abortifacients	0	0.00
No alcohol consumption during pregnancy	1038	92.43
No smoking during pregnancy	3	0.27
Prohibition to enter marked areas for pregnant women	1	0.09
Prohibition on the use of the marked product during pregnancy	79	7.03
Prohibition on the labeled product use while breastfeeding	1	0.09
No data	1	0.09
Σ	1123	100.00

Table 2. Previous contact with the sign

	n	%
Yes	510	45.41
Rather not	280	24.93
No	331	29.47
No data	2	0.18
Σ	1123	100.00

Table 3. Previous knowledge of the sign

	n	%
Known	605	53.87
Unknown	78	6.95
Unknown, but I acquired it from the statement	435	38.74
No data	5	0.45
Σ	1123	100.00

DISCUSSION

Due to high prevalence of stimulants use among young people, it is necessary to label products that are harmful for consumption or contact, especially when addressed to

women who are pregnant. Pictograms placed on the packaging of products that are potentially toxic to pregnant women and the fetus are particularly useful in this respect. Due to their simplicity and clarity of the message, the signs are widely used in many countries.

The examined group consisted of first-year medical students, i.e. those without deeper medical education. Most of the respondents correctly recognized the warning sign. The graphic form of the sign undoubtedly contributed to its correct interpretation, but a large group of the respondents admitted that they had gained its meaning from the description given to previous questions. In the work by Towarek [8] on the knowledge of systems informing about the risk of substance toxicity, it was shown that the knowledge of young people in Poland in this area may be insufficient.

Warning labels are a special type of health notification, often placed on the packaging of alcoholic beverages. Their task is to inform general public about health hazards associated with alcohol consumption, including those with pregnancy. WHO recommends that such warnings should be widely used around the world. However, it is important to distinguish consumer information from health warnings. The former is usually placed on the packaging of food and beverage products, and can include information on nutritional values, ingredients, sell-by dates and alcohol content that enables consumers to compare products while making appropriate choice. The European Economic Community first issued a directive on the labeling of food products in 1978, and in 2000, following a detailed directive of the European Parliament, the legislation of individual European Union Member States regarding food labeling was unified [9].

Health warnings are a mandatory type of marking. Their purpose is to inform about health hazards related to the use of potentially toxic products. Such warnings were introduced on alcohol packaging after the campaign of similar messages placed on tobacco products proved successful [10]. Most often, it is also required to place warning slogans on such labels under a "WARNING" statement. When used consistently, alcohol warning labels are believed to increase health awareness among the population and contribute to reducing alcohol consumption [11].

The effectiveness of the sign depends on the level of its perception and the ability to follow its meaning by reading, understanding and remembering it. That can be achieved by font size and type, border, color and contrast, as well as supportive illustrations. It has been shown that signs with a wide border attract the attention of recipients to a greater extent than those with a marked thin line or without it. The color of the text and the background also contribute to better noticeability of the sign [12,13]. Another element that influences effectiveness of the sign is its content. Such a warning should be understandable, uncomplicated and the target behavior of the recipient should be clear and easy to perform [13]. It has been shown that signs containing illustrations tend to be more effective than those incorporating only text [12,13]. Research has demonstrated that the effectiveness of warning labels is determined by such elements as: red color signaling a threat, a frame or white space, location on the packaging, as well as the presence of meaningful text accompanying the pictogram [14].

According to research in France [15], the visibility of graphic symbols on alcoholic beverage packaging is too low, so they may not be effective in warning about the substance toxicity. Unfortunately, most graphic markings on alcoholic beverages are too inconspicuous (average size 0.4 cm) and are placed on the back of the packaging. It seems that increasing the size of pictograms and adding contrast or color may trigger increased consumer attention [16]. Indirect impact of warning labels on alcohol consumption may include influencing one's beliefs about alcohol harmfulness, mechanisms and intentions to change behavior, emotional reactions related to labels and social climate around alcohol-related issues [17].

A study, also conducted in France (a telephone survey performed on a group of over 3,600 pregnant and postpartum mothers), on the knowledge of the risk of alcohol abuse during pregnancy and perception of warning labels on alcoholic products packaging revealed that warning labels were noticed by 66% of all women, and, notably, 77% of all women who consumed alcohol before pregnancy. Within the group of women who paid attention to the labels, almost 99% believed that the signs rather suggested abstinence. Moreover, almost 41% of the respondents believed that wine and beer were supposed to be less harmful than high alcoholic drinks. Almost 9% of the women thought that drinking beer while breastfeeding was approved without any harmful consequences [15].

There are many reports in the field literature on protective factors against alcohol abuse, as well as risk factors for alcohol consumption during pregnancy. Knowledge about these can be used to identify groups of pregnant women who require additional interventions or screening tests. It has been demonstrated that both age and education are factors that influence health behaviors related to alcohol consumption, but they vary depending on subpopulation and country of origin [18,19]. A study conducted in Australia showed that older age and a higher level of education gained were associated with greater risk of alcohol use during pregnancy [20]. In a Canadian study it was observed that younger age and records of mental illness stated in interviews resulted in more frequent alcohol consumption by pregnant women [19]. It is believed that women do not refrain from drinking alcohol consumption during pregnancy for reasons such as violence, alcohol addiction before pregnancy or inadequate perinatal care [5]. Advertisements of alcoholic products aimed at women, presenting alcohol as a source of fun, pleasure or just a way to combat stress, increase sexual attractiveness or strengthen social bonds may also be considered as possible causes that result in increased number of women abusing alcohol [21]. Further research on this topic is undoubtedly needed to be carried out.

The presented study had some limitations. It needs to be mentioned that there was a large number of incorrectly completed questionnaires which ultimately reduced the final amount of useful data. Additionally, the survey was conducted on a group of medical university students. Such individuals have much broader knowledge of health issues than their peers from other faculties. This could also have affected the final analysis of the study. Nevertheless, the information obtained from multicenter study comprising

a group of 1,123 respondents allows, in the authors' opinion, is adequate for determining knowledge of the pictogram's meaning in a representative way.

CONCLUSIONS

Pictograms can be a useful tool in health education. Adding a graphic form to the sign prohibiting/warning against the use of alcohol allows for its correct interpretation. There is a further need to educate young people, among whom there is still a high percentage of unintended pregnancies, in the knowledge of factors toxic to pregnant women and the fetus. Thus, substances harmful to pregnant women should be provided with clear and legible warning labels.

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REFERENCES

- Hetea A, Cosconel C, Stanescu AAM, Simionescu AA. Alcohol and psychoactive drugs in pregnancy. *Maedica (Bucur)*. 2019;14(4):397-401.
- Popova S, Lange S, Probst C, Gmel G, Rehm J. Estimation of national, regional, and global prevalence of alcohol use during pregnancy and fetal alcohol syndrome: a systematic review and meta-analysis. *Lancet Glob Health*. 2017;5:e290-9.
- World Health Organization. *Global status report on alcohol and health*, 2018. Geneva: World Health Organization; 2018.
- Bearak J, Popinchalk A, Alkema L, Sedgh G. Global, regional, and subregional trends in unintended pregnancy and its outcomes from 1990 to 2014: estimates from a Bayesian hierarchical model. *Lancet Glob Health*. 2018;6:e380-9.
- Popova S, Dozet D, Akhand Laboni S, Brower K, Temple V. Why do women consume alcohol during pregnancy or while breastfeeding? *Drug Alcohol Rev*. 2022;41(4):759-77.
- Greenmyer JR, Klug MG, Kambeitz C, Popova S, Burd L. A multicountry updated assessment of the economic impact of fetal alcohol spectrum disorder: costs for children and adults. *J Addict Med*. 2018;12:466-73.
- Dathe K, Schaefer C. The use of medication in pregnancy. *Dtsch Arztebl Int*. 2019;116(46):783-90.
- Towarek J. *Znajomość systemów informujących o zagrożeniu toksycznością substancji wśród młodzieży* (niepublikowana praca doktorska). Lublin: Uniwersytet Medyczny w Lublinie; 2018.
- Marcotrigiano V, Lanzilotti C, Rondinone D, De Giglio O, Caggiano G, et al. Food labelling: Regulations and Public Health implications. *Ann Ig*. 2018;30(3):220-8.
- Pettigrew S, Jongenelis M, Chikritzhs T, Slevin T, Pratt IS, et al. Developing cancer warning statements for alcoholic beverages. *BMC Public Health*. 2014;14:786.
- Heenan M, Shanthosh J, Cullerton K, Jan S. Influencing and implementing mandatory alcohol pregnancy warning labels in Australia and New Zealand. *Health Promot Int*. 2023;38(3):1-10.
- Wogalter MS, Conzola VC, Smith-Jackson T. Research based guidelines for warning design and evaluation. *Appl Ergon*. 2002;33:219-30.
- Leoniak K. *Rola uzasadnienia i sankcji w perswazyjności znaków zakazu i nakazu*. Warszawa: Szkoła Wyższa Psychologii Społecznej; 2012.
- Dimova ED, Mitchell D. Rapid literature review on the impact of health messaging and product information on alcohol labelling. *Drugs Educ Prev Policy*. 2022;29:1-13.
- Dumas A, Toutain S, Hill C, Simmat-Durand L. Warning about drinking during pregnancy: lessons from the French experience. *Reprod Health*. 2018;15(1):20.
- Millot A, Serra M, Gallopel-Morvan K. How the alcohol industry fought against pregnancy warning labels in France. A press coverage analysis spanning 20 years. *Front Public Health*. 2022;10:933164.
- O'Brien P. Warning labels about alcohol consumption and pregnancy: moving from industry self-regulation to law. *J Law Med*. 2019;27:259-73.
- England LJ, Bennett C, Denny CH, et al. Alcohol use and co-use of other substances among pregnant females aged 12-44 years – United States, 2015-2018. *Morb Mortal Wkly Rep*. 2020;69:1009-14.
- Popova S, Dozet D, O'Hanlon G, Temple V, Rehm J. Maternal alcohol use, adverse neonatal outcomes and pregnancy complications in British Columbia, Canada: a population-based study. *BMC Pregnancy Childbirth*. 2021;21:74.
- Stanesby O, Cook M, Callinan S. *Examining trends in alcohol consumption during pregnancy in Australia, 2001 to 2016*. Canberra: Foundation for Alcohol Research and Education; 2018.
- Lyall V, Wolfson L, Reid N, Poole N, Moritz KM, Egert S, et al. "The problem is that we hear a bit of everything...": A qualitative systematic review of factors associated with alcohol use, reduction, and abstinence in pregnancy. *Int J Environ Res Public Health*. 2021;18(7):3445.